

## NEW SUBSPECIES OF *LEIOCEPHALUS* FROM CUBA

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THE taxonomic status of specimens of *Leiocephalus* from eastern Cuba is in question. Some of these lizards were tentatively regarded by me as *L. cubensis*; later I regarded them as of the species *L. stictigaster* but did not assign them to subspecies (Schwartz, 1959, 1960). I had hoped to secure fresh comparative material during the summer of 1960, when I collected in Cuba under National Science Foundation Grant G-6252. This expectation was at least partly successful, since now the population of *L. stictigaster* from the serpentine savannas in Camagüey Province is well known. No additional material has been taken in Oriente, however. A day's trip to Cayo Sabinal, off the north coast of Camagüey, likewise produced a series of *L. stictigaster* which represents a new insular form.

I wish to acknowledge the assistance of the National Science Foundation in subsidizing my collecting in Cuba. During the summer of 1960 I had the enthusiastic and capable assistance of Messrs. Ronald F. Klinikowski, David C. Leber, and James D. Smallwood; Messrs. Klinikowski and Leber had National Science Foundation Undergraduate Research Participation grants at that time. Mr. Klinikowski has executed the figures for the present paper as well. For comparative material I wish to thank Dr. Ernest E. Williams, Museum of Comparative Zoology (MCZ), who has allowed me to reexamine some pertinent old Oriente material, and Sr. Miguel Jaume, of the Museo y Biblioteca de la Zoología de la Habana (MBZH) for like permission. Our visit to Cayo Sabinal was made possible through the cooperation of Sr. Carlos Betancourt.

*L. stictigaster* occurs in two general areas: in Pinar del Río Province and the Isla de Pinos, and in Camagüey and Oriente provinces. There are two subspecies known from Pinar del Río (*stictigaster* and *sierrae*), two from the Isla de Pinos (*exotheotus* and *astictus*), and another from a very restricted area in Camagüey (*lucianus*). *L. cubensis*, the larger species to which *stictigaster* is related and with which it was long confused, is not known to be sympatric with *stictigaster* at any one locality. The subspecies *lucianus*, for example, whose range is included within the presumed

range of *L. c. cubensis*, does not occur with *cubensis*, although it does occur with or immediately adjacent to the species *L. carinatus* and *macropus*. Of the two new subspecies described herein, neither is known to occupy territory with any other *Leiocephalus*; on Cayo Sabinal we encountered only *stictigaster* and in the serpentine savannas, no other *Leiocephalus* was seen or taken except this same species.

*Leiocephalus stictigaster parasphex*, new subspecies

*Type*. American Museum of Natural History (AMNH) 92153, an adult male, from Playa Bonita, east end Cayo Sabinal, Camagüey Province, Cuba, taken 31 July 1960, one of a series collected by Ronald F. Klinikowski, David C. Leber, and James D. Smallwood. Original number 9596.

*Paratypes*. AMNH 92154-73, same data as type.

*Diagnosis*. A subspecies of *Leiocephalus stictigaster* characterized by longitudinally lined dorsum in which the dorsal fields are solid brown, lateral fields brown with red or orange flecking in males, throat and venter pale yellow, venter without dark spots but with red or orange spots laterally, throat clouded grey with a linear pattern present but not distinct, and parietal scales usually not in contact.

*Distribution*. Known only from the type locality but presumed to occur throughout Cayo Sabinal.

*Description of type*. An adult male with the following measurements (in mm) and counts: snout-vent length 65, tail 67 (distal two-thirds regenerated), snout to anterior border of tympanic opening 15.3, head width 12.2, supraocular scales 6/6, loreals 5, temporals 10, enlarged auricular scales 5/4, median head scales 4, prefrontal row complete 3 scales, frontoparietal row destroyed, semi-circles unknown, parietal contact unknown, dorsal crest scales occiput to vent 50, dorsal crest scales occiput to axilla 16, scales around one half body at mid-body 24, fourth toe subdigital tricarinate scales 23/23.

*Coloration of type*. The dorsal coloration of the type is generally dark brown with orange sides, the pigments arranged in the typical zoned pattern of *stictigaster* as follows: Zone 1 is narrow and brown and restricted to the dorsal crest scales. Laterally, Zone 2 is dull tan and rather sharply set off from Zone 3, the dorso-

lateral fields, which are very dark rich brown. The dorsolateral fields are again sharply differentiated from Zone 4 which is wide and tan, and extends from the temporal region posteriorly onto the unregenerated proximal third of the tail. Zone 5 is brown with much vivid red and orange flecking; it begins posterior to the eye and continues to the groin. There are no longitudinal dark brown dashes in Zone 5. Zone 6 is cream, very bold and distinct, beginning below the eye, continuing over the tympanic opening and reaching the groin posteriorly. Below Zone 6 is a bright orange longitudinal region (Zone 7), which is reddish-orange and very brilliantly differentiated from both Zone 6 above and the pale yellow ventral coloration below. The dorsal surface of the head is solid brown without darker brown or black pigmentation. The postorbital blotch is absent, the temporal region having the same brown coloration as Zone 5. The dorsal surfaces of the limbs are brown with some orange and tan flecking; neither fore- nor hind limbs have any indication of dark flecks or dashes. The unregenerated portion of the tail lacks chevrons or other dark dorsal markings but does show the caudal extension of tan Zone 4. The throat is diffusely marked with dark gray on a clouded grayish-yellow ground color; there are two large V's, their apices directed forward, and a posterior pair of paramedian lines, superimposed on almost a gray reticulum, which in turn is only moderately distinct from the clouded grayish-yellow ground color (Fig. 1). The gray reticulum extends posteriorly onto the chest. The remainder of the belly is immaculate pale yellow, as is also the underside of the limbs and tail.

*Variation.* In snout-vent length, ten males (type and paratypes) average 63.7 (57-75), and eleven parotypic females average 55.1 (50-59). Dorsal crest scales in occiput-vent length (combined data for both sexes) average 52.1 (46-58), and dorsal crest scales in occiput-axilla length average 19.5 (16-22). One-half scales at mid-body average 22.9 (21-27), loreals 5.2 (3-10), temporals 11.4 (10-14), fourth toe subdigital tricarinate scales 23.6 (22-26). The parietals are more often not in contact (78 per cent), and the semicircles are more often in contact (80 per cent). The median head scales vary from 4 to 7 (mode 4). The prefrontal row is complete in all examples, and varies from 3 to 6 scales (mode 3). The frontoparietal row is usually complete (twelve of fifteen lizards) and has 4 to 9 scales (mode 5).

The paratypes include nine males, all adult. In dorsal coloration and pattern these agree very closely with the type, all having the distinct and bold longitudinal zones, the dorsolateral fields dark brown, the pale tan or cream lines, and the brightly colored lower sides (Zone 7). Some adult males have the dorsolateral fields brown, heavily speckled with red or orange, and these colors always form a prominent part of the lateral fields (Zone 5) and the lower accessory Zone 7. The throat pattern in males is variable in both extent and intensity. The ground color is always clouded with grey. The two gray V's may be entire or much fragmented, and the two paramedian posterior lines are likewise variable. These major pattern elements may be superimposed upon a gray to dark gray reticulum, which may as well combine with the V's and paramedian lines, to give a uniform dark gray reticulum. The gray throat pattern may extend rather far posteriorly onto the chest or even down onto the sides of the abdomen; in the latter case the dark gray spots are replaced by isolated red or orange scales, which follow the same general trend as the dark gray, more anterior scales and are a continuation of the gray pattern posteriorly. The bellies of all specimens are immaculate.



Fig. 1. *Leiocephalus stictigaster parasphex*, new subspecies, ventral view of throat; type, AMNH 92153. Fig. 2. *Leiocephalus stictigaster lucianus*, ventral view of throat; AMNH 92174, 1 mi. E Playa Santa Lucía, Camagüey Prov., Cuba. Fig. 3. *Leiocephalus stictigaster ophioplacodes*, new subspecies, ventral view of throat; type, AMNH 92771.

The females resemble the males dorsally, except that there is a distinct reduction of amount of red and orange in all fields, these colors being completely absent except in large females. The ventral surface is pale yellow in all; there may be dull orange spots



on the venter, or it may be immaculate. The throat pattern resembles that of males except that it is much more diffuse. The two V's may disappear almost completely, leaving only dark fragments, or they may be joined randomly to one another by dark reticular markings. The two paramedian lines retain their integrity to a greater extent and may even be paired laterally with another pair of dark longitudinal lines which are also occasionally indicated in males. The throat ground color is always a dirty yellow. Only one female shows any indications of dark leg dots or markings on the hindlimbs, and none, like the males, has any indication of dark dashes in the lateral fields.

*Comparisons.* The range of *L. s. parasphex* is removed from that of *L. s. lucianus* by a narrow channel with a maximum depth of fifteen fathoms. Consequently, *parasphex* needs comparison principally with *lucianus*. The two subspecies are very different in coloration and pattern. The throat pattern differences are at once obvious. Both sexes of *lucianus* have bold black throat markings (Fig. 2) that are almost always complete (two V's and a pair of paramedian lines as in *parasphex*) and, even when reduced in extent, are not reduced in intensity. In *lucianus* there is no indication of throat clouding nor a gray throat reticulum. The dorsal pattern of *lucianus* lacks red or orange as a chromatic component, the insular race having much more brightly colored back and sides. All male *lucianus* have brown ventral dots which extend onto the underside of the hind limbs and along the sides of the tail. These dots are absent in *parasphex*. The throat pattern of *lucianus* often includes a short transverse median bar anterior to the apex of the throat V; this item is absent or at best very obscure in *parasphex*. The females of *lucianus*, besides having a much more clear-cut throat pattern than those of *parasphex*, likewise have the venter more heavily and uniformly dotted with brownish.

*L. s. parasphex* and *lucianus* are close in all scale counts. There are no striking differences in number of dorsal crest scales, either between the occiput and vent or occiput and axilla, although *parasphex* averages very slightly higher (52.1 vs. 51.6) in occiput-vent scales and somewhat lower (19.5 vs. 22.0) in occiput-axilla scales. Both have the semicircles more often complete than incomplete. The major scale difference is in parietal contact; *lucianus* usually (73 per cent) has the parietals in contact whereas *parasphex* usually (78 per cent) has them not in contact.

*Remarks.* The northern coast of Camagüey Province has, in addition to many small cays and islets, a series of large cays, paralleling the coast for about 190 kilometers (Fig. 4). These cays include, from west to east, Cayos Coco, Romano, Guajaba, and Sabinal. Sabinal is thus the easternmost of the series and is closest to the mainland, being separated only by two very narrow channels and the Bahía de Nuevitas. Of the other cays, Romano is tied to the mainland by a narrow isthmus. The herpetological fauna of these cays is completely unknown except for that of Sabinal. Whether *L. stictigaster* occurs on the other three cays in this chain is unknown.

*Etymology.* From Greek *para* (along side of) and *sphex* (wasp), in reference to the abundant wasp population that makes collecting somewhat hazardous on Cayo Sabinal.

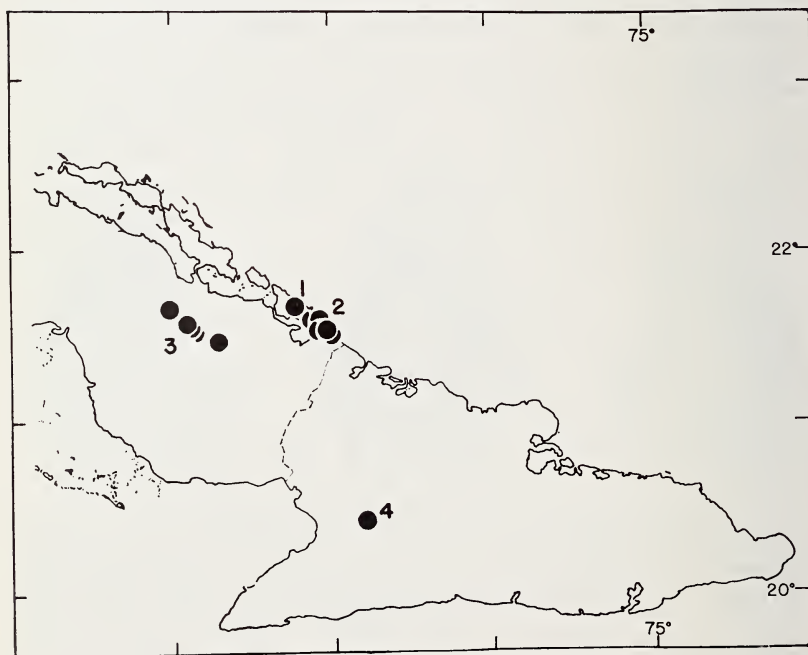


Fig. 4. Eastern Cuba, including the provinces of Camagüey and Oriente, showing known distribution of subspecies of *L. stictigaster*, as follows: 1) *para-sphex*; 2) *lucianus*; 3) *ophioplacodes*; 4) Bayamo specimens.

*Leiocephalus stictigaster ophiacodes*, new subspecies

*Type.* AMNH 92771, an adult male, from 2.7 mi. SE Bonao, Camagüey Province, Cuba, taken 3 August 1960, one of a series collected by Ronald F. Klinikowski and James D. Smallwood. Original number 9666.

*Paratypes.* AMNH 92770, 92772-78, same data as type; AMNH 92779-80, 0.1 mi. SE Bonao, 3 August 1960, A. Schwartz, J. D. Smallwood; AMNH 92781-82, 1.5 mi. SE Bonao, 3 August 1960, R. F. Klinikowski, J. D. Smallwood; MCZ 59229, ca. 20 km N Camagüey, Camagüey Province, Cuba, 21 August 1959, R. Molina, E. E. Williams, R. Ruibal; MCZ 59335, south of west end of Sierra de Cubitas, Camagüey Province, Cuba, 1959, R. Molina, E. E. Williams, R. Ruibal.

*Diagnosis.* A subspecies of *Leiocephalus stictigaster* characterized by longitudinally lined dorsum in which the dorsal fields are solid brown, orange spots on sides of abdomen large and prominent and blending into orange lower sides, distinct cream longitudinal stripes on back and sides, vivid orange groin, venter pale yellow with orange to brown dots, cream colored throat with bold and distinct black pattern, large size, high number of dorsal crest scales in occiput-vent and occiput-axilla distances, and high number of midbody scales.

*Description of type.* An adult male with the following measurements and counts: snout-vent length 70, tail 59 with regenerated tip, snout to anterior border of tympanic opening 16.5, head width 12.5, supraocular scales 6/6, loreals 5, temporals 15, enlarged auricular scales 4/2, median head scales 4, prefrontal row complete 3 scales, frontoparietal row complete 5 scales, semicircles incomplete, parietal contact present, dorsal crest scales occiput to vent 58, dorsal crest scales occiput to axilla 20, scales around one-half body at mid-body 28, fourth toe subdigital tricarinate scales 18/21.

*Coloration of type.* The dorsal coloration of the type is generally dark brown with orange on the side and lower sides, the pigments arranged in the typical zoned pattern of *stictigaster* as follows: Zone 1 inconspicuous and blending into Zone 2 which is pale brownish and not especially sharply set off from dark brown Zone 3, the dorsolateral fields, which in life were rather heavily flecked with orange. The dorsolateral fields are fairly sharply differentiated from Zone 4, which is cream and extends from the

temporal region onto the base of the tail. Zone 5 is brown with heavy orange flecking, most pronounced in the groin, which is vivid orange in life; Zone 5 lacks conspicuous dark brown dashes. Zone 6 is cream and very distinct, beginning below the eye and extending to the groin. Below Zone 6 is a bright orange longitudinal region (Zone 7), which was vividly orange in life. The dorsal surface of the head is brown without dark brown or black spotting or markings. The dorsal surface of the forelimbs is brown, flecked with some orange, and the hind limbs were orange dorsally with cream spots. The unregenerated portion of the tail has a dorsal pattern of about eleven chevrons, with their apices pointed posteriorly, which follow four pairs of brown spots on the base of the tail. The venter is pale cream with a bold black throat pattern, consisting of the incomplete remnants of two V's, their apices pointed forward, and two pairs of longitudinal lines on the throat itself, the paramedian pair much fragmented and barely discernible, the lateral pair more or less attached to the posterior V (Fig. 3), the whole throat pattern blending into some orange spotting on the chest, and on the sides of the abdomen, where the scattered orange dots merge with the orange pigment of Zone 7. The underside of the limbs and tail is immaculate cream, without any indication of dark dots or longitudinal dashes.

*Variation.* In snout-vent length, six males (type and paratypes) average 67.7 (57-73), and seven paratype females average 63.3 (58-70). Two paratypes are juveniles with snout-vent lengths of 27 and 33. Dorsal crest scales in occiput-vent length (combined data for all specimens) average 57.2 (51-60), and dorsal crest scales in occiput-axilla length average 22.1 (18-27). One-half scales at mid-body average 27.2 (25-30), loreals 5.6 (4-8), temporals 13.1 (11-15), and fourth toe subdigital tricarinate scales 24.1 (18-28). The parietals are in contact slightly more often (58 per cent) than not, and the semicircles are more often complete (58 per cent) than not. The median head scales vary from 4 to 6 (mode 4), the prefrontal row is usually composed of three scales and is complete. The number of frontoparietals varies from 5 to 7 (mode 7), and only one lizard has the frontoparietal series interrupted.

The paratype males are dorsally like the type; one has Zone 6 white and very bold in contrast to the adjacent ones. All had orange in the groin, in Zone 7, and on the hindlimbs. The venter is usually immaculate cream, although a small subadult male (snout-vent



57) shows some indication of ventral spotting like the females. All paratypes have the throat pattern more distinct and complete than does the type. The two V's and the two pairs of longitudinal lines are well expressed on a clear and unclouded cream ground color, and in only two specimens is the paramedian pair of lines joined to the posterior V. Three males show some dark orange flecking on the underside of the limbs and basal portion of the tail. The dark throat pattern merges with orange spots and dots on the chest. These spots continue laterally and posteriorly onto the sides of the abdomen and merge with the orange pigment of Zone 7.

The females have contrasting dorsal longitudinal lines as do the males, although Zones 4 and 6 are duller than in the males. The dorsolateral and lateral fields (Zones 3 and 5) have a series of transverse or vertical black bars which obscure to a large extent the dark brown ground color of these fields. Zone 7 likewise has some black vertical barring. The dark throat pattern is just as clear-cut in females as males; the bellies are spotted with brown (laterally) to orange (centrally), and these ventral spots may be elongate to form rather ill-defined longitudinal dashes. The hind limbs are rather dull orange; there are no dark dots or dashes on the underside of the hind limbs or tail.

*Comparisons.* *L. s. ophioplacodes* is by far the most brilliantly colored of the three Camagüeyan subspecies of *stictigaster*. In coloration it is readily distinguished from both *lucianus* and *parasphex* by the orange groin and orange hind limbs. The throat pattern differs from that of *parasphex* in that it is bold and black on a clear cream ground rather than diffuse and gray on a gray-clouded yellow ground. From *lucianus*, the throat pattern of *ophioplacodes* differs in lacking the pre-V transverse dark dash. Ventrally, *lucianus* and *ophioplacodes* males are readily distinguished by the presence of dark dotting in the former. Females of *lucianus* and *ophioplacodes* are similar, although female *ophioplacodes* are more brilliantly colored than those of *lucianus* and have transverse or vertical black bars in the fields, a feature which is absent in female *lucianus*.

Although male *ophioplacodes* from the type locality do not reach so large a size as do males of the other two eastern races, females exceed female *lucianus* and *parasphex* in snout-vent length. The discrepancy in male size is possibly due the small sample. Although

*ophioplacodes* averages higher in both dorsal crest counts, loreals, and temporals, the amount of overlap is very great. Only in mid-body scales is there a higher average (27.2) in *ophioplacodes* than in *lucianus* (23.8) and *paraphex* (22.9), with less overlap of the counts (21 to 27 in both *lucianus* and *paraphex*, 25 to 30 in *ophioplacodes*).

Although comparisons between the Camagüey races are more pertinent, these races may be compared with the western Cuba and Isla de Pinos races as well. Of the eastern races, only *astictus* has the parietals more often not in contact as does *paraphex*. These two races can be differentiated by color and pattern; *astictus* has the sides red with green dots, a feature not found in *paraphex* (in fact, all Camagüey races lack green in the pattern completely). Both races have immaculate bellies, but the orange to red lateral dots of *paraphex* are not found in *astictus*. The dorsal crest scales in occiput to vent in *paraphex* average higher than those of all western forms except *s. stictigaster*, and the dorsal crest scales in occiput-axilla average lower than all races except *sierrae*.

*L. s. ophioplacodes* reaches a larger size than all the eastern races, although it is approached by *L. s. stictigaster*. Dorsal crest scales in occiput-vent average greater in *ophioplacodes* than in any other subspecies. Only nominate *stictigaster* has the parietal contact relationship (slightly more often in contact) the same as in *ophioplacodes*. Detailed comparison of coloration and pattern is unnecessary; the eastern race is so much more brightly colored with its orange hind legs and bold throat pattern than any of the western subspecies that it is at once distinguishable on these features alone, without resort to scale counts and measurements.

*Etymology.* From Greek *ophis* (serpent) and *plakodes* (plain-dweller), in reference to the serpentine savannas of central Camagüey.

#### DISCUSSION

With the occurrence of *L. stictigaster* now well established in Camagüey Province, there remain three anomalous specimens from Oriente. Two of these in the Museo Poey, Universidad de la Habana, are no longer available to me. I commented (1959, p. 110) that these "two Bayamo specimens . . . are even more peculiar; they are distinctly lined dorsally, have well defined zones 4 and 6, and lack a postorbital spot. The male is dotted ventrally and has dots in the lateral fields; both individuals have heavily marked

throats, . . . The dorsal crest scales are 51 and 56". Since the above was written I have examined another large adult male (MBZH 130) also from Bayamo, Oriente Province, and collected by Charles T. Ramsden. The specimen is presently before me, and it agrees in detail with the two Bayamo specimens mentioned above. The dorsal crest scales are 54 between occiput and vent, giving the range of 51 to 56 for the three known extant Oriente specimens. The throat pattern is bold on an unclouded ground, the brown lateral fields have prominent dark brown dashes, and the belly is marked with dark brown longitudinal dashes. The snout-vent length is 87; this lizard is thus the largest specimen of *L. stictigaster* I have examined. Of the two Museo Poey specimens, the male has a snout-vent length of 86, the female a snout-vent length of 78; all three Bayamo specimens are thus very large.

I have no doubt that these three lizards represent yet another subspecies of *L. stictigaster* from the Bayamo region, characterized by large size, high number of dorsal crest scales, and distinctive throat and body pattern. However, since there are only three specimens available, and since two of these now are not before me, there seems little justification in describing this population. It is sufficient for the moment to acknowledge the occurrence of *L. stictigaster* in western Oriente and hope that at some future date more Oriente material will become available.

The apparently split distribution of *L. stictigaster*, with one group of subspecies on the Isla de Pinos and in Pinar del Río, and another group in Camagüey and Oriente, is puzzling. Although *L. stictigaster* does not occur with *L. cubensis* anywhere in the ranges of the two species, these two forms have peculiarly complementary distributions, for example, on the Isla de Pinos (two subspecies of *stictigaster* separated by a race of *cubensis*), and in northern Camagüey (*cubensis* in the Sierra de Cubitas and associated mesic foothill areas, *stictigaster* both north and south of this mountain range on the xeric coast and the xeric savannas). In Pinar del Río *stictigaster* is sympatric with *L. carinatus*, as it is widely and in detail elsewhere. In some areas (i.e., Playa Santa Lucía, Camagüey) *stictigaster* also occurs with *L. macropus*. The vast interior of Cuba, however, is unoccupied by *Leiocephalus* except for *L. cubensis*. It seems hardly likely, despite the fact that *cubensis* and *stictigaster* do not occupy the same areas, that the latter species is unable to survive somewhere between central Pinar del Río

and east-central Camagüey. Such a hiatus seems more probably to be a result of inadequate collecting in the intervening area rather than a reflection of a really disjunct distribution.

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Quart. Jour. Florida Acad. Sci. 27(3) 1964